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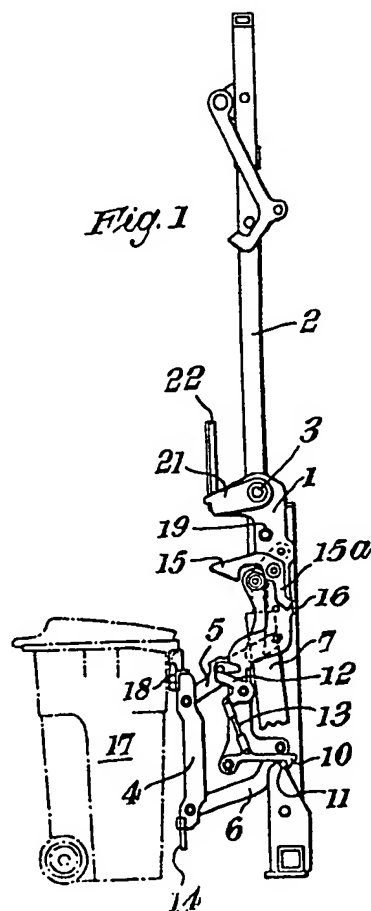
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None

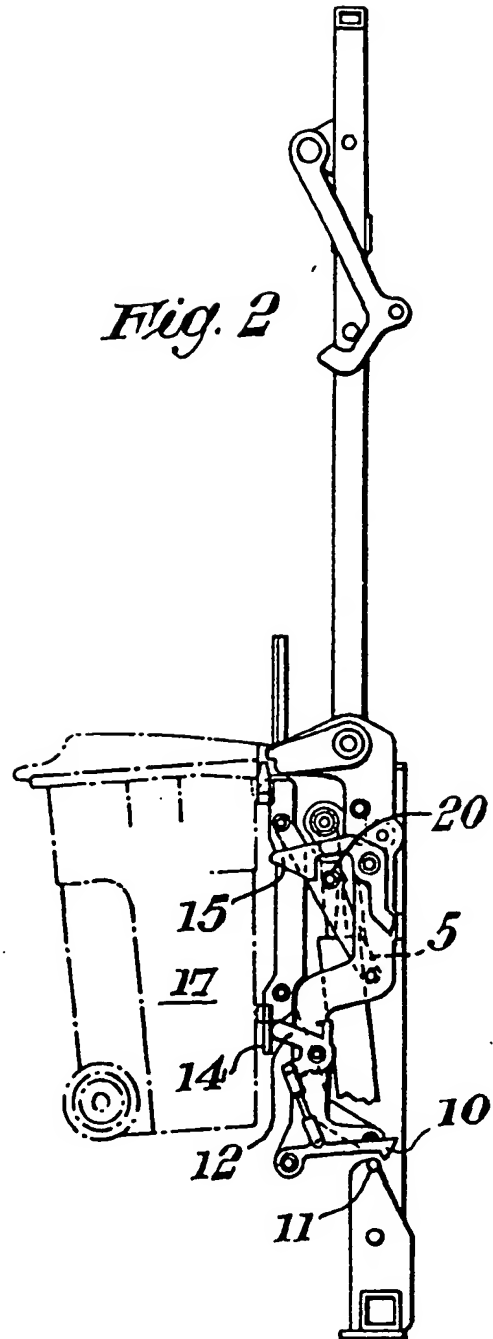
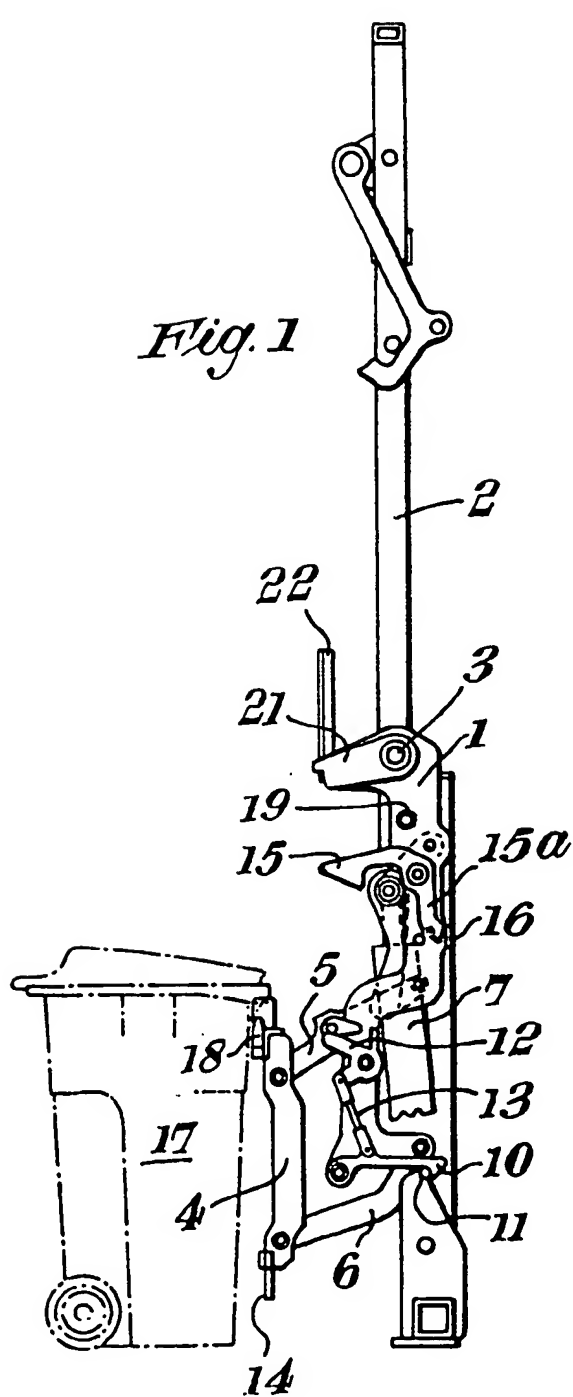
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(54) Container emptying mechanisms

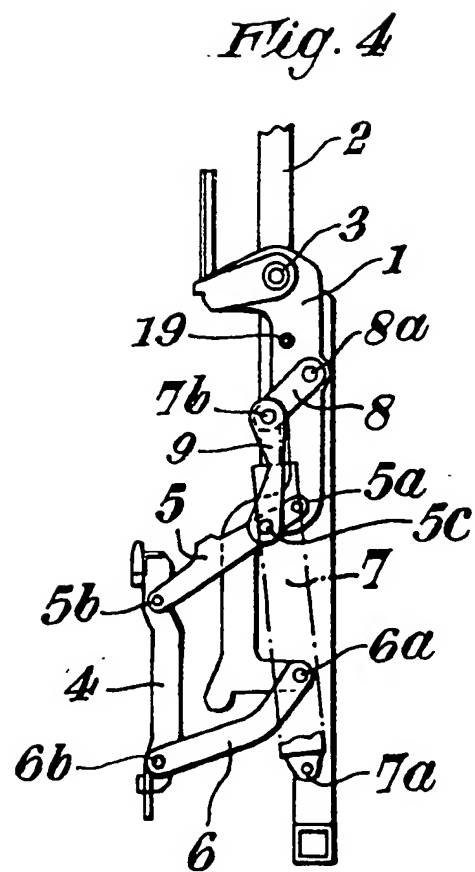
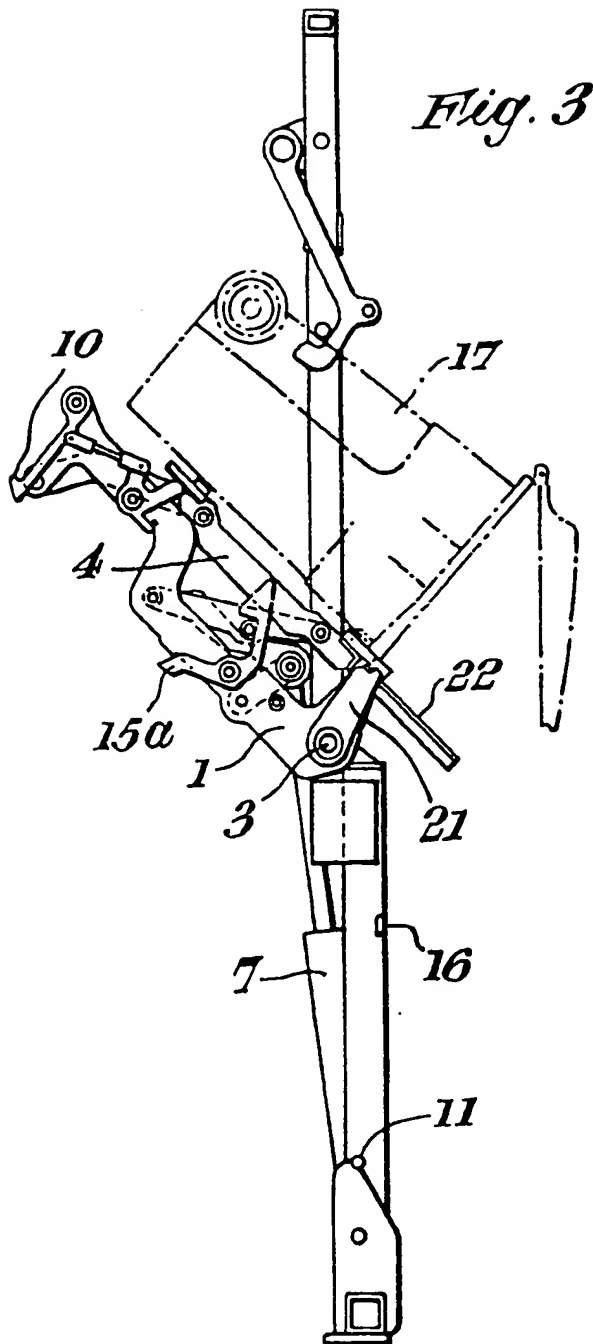
(57) A mechanism for lifting and inverting a container to discharge its contents, comprising a first frame 1 mounted on a support 2 for movement about pivot 3, a second frame 4 mounted on the first frame by a parallelogram linkage 5, 6 and adapted to engage a container 17, the second frame having a first, lower position spaced from the first frame and a second, raised, position adjacent the first frame, so that by moving the second frame from its lower to its raised position by ram 7, the container is lifted while being held upright, and by then further extending the ram the first frame is pivoted so that the container is further lifted and inverted. A latch 10, 11 is provided between the first frame and the support to prevent movement of the first frame until the second frame is raised, and a further latch 15 is provided between the first and second frames to inhibit relative movement of the frames when the first frame begins to pivot.



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SPECIFICATION

Container emptying mechanisms

5 The present invention relates to mechanisms for emptying containers, and particularly concerns mechanisms which first lift then invert a container to discharge its contents.

Various mechanisms have been proposed, for use
10 for example in the collection of refuse or other waste, in which containers filled with refuse are lifted and then upturned to discharge the waste into a vehicle, a compactor, or a container. Such mechanisms are usually mounted on the vehicle or compactor and
15 utilise its own hydraulic power.

Hitherto, the lifting and upturning of the container have been controlled by separate hydraulic actuators, and thus a complicated and expensive interlocked control system is necessary to prevent
20 the container from being upturned until it has been fully lifted, and to prevent the container from being lowered again until it is returned to its initial upright orientation.

The present invention seeks to simplify the
25 construction of such mechanisms and their controls, by providing a system for lifting and upturning a container which is operated by a single actuating device and requires no hydraulic control interlocks.

According to the present invention, a mechanism
30 for lifting and upturning a container comprises a first frame mountable to a support for pivotal movement about a first horizontal pivot axis, between a first, generally vertical, position and a second, upturned position and a second frame adapted to engage a
35 container and mounted to the first frame by upper and lower parallel pivot arms, for movement between a first lower position away from the first frame, and a second, raised, position adjacent the first frame, first releasable latching means being
40 provided between the support and the first frame to hold the first frame in its generally vertical position, and second releasable latching means being provided between the first and second frames to hold the second frame in its raised position adjacent
45 the first frame, the first latching means being released when the second frame is in its raised position, and the second latching means being engaged when the first frame moves out of its generally vertical position, and an actuator
50 operatively associated with the second frame and the support to apply an upward force to the second frame.

Preferably, the actuator is a hydraulic ram connected to the second frame via a trailing link
55 pivotally attached between the ram piston and one or more of the upper pivot arms. Advantageously the mechanism includes two upper and two lower pivot arms, with the hydraulic ram acting between them.

The first latching means preferably comprises a
60 hook member pivotally mounted on the first frame to engage a detent on the support, the engagement being released by the second frame in its raised position contacting a release lever connected to the hook. The second latching means is advantageously
65 comprised by a hook pivotally mounted on the first

frame to engage a detent on the second frame, the hook being released by contacting an abutment on the support when the first frame is in its vertical position.

70 One embodiment of the present invention will now be described in detail with reference to the accompanying drawings, in which:

Figure 1 is a schematic side view of the mechanism in its rest position;

75 *Figure 2* is a view similar to *Figure 1* with the second frame lifted;

Figure 3 is a schematic side view showing the upturned position of the first frame; and

80 *Figure 4* is a side view showing the general arrangement of the main mechanism members.

Referring now to *Figures 1* and *4*, the mechanism comprises a first frame 1 mounted on a support 2 at pivot 3. The first frame 1 will comprise two side members, as shown, connected by transverse
85 elements such as bars (not shown).

A second frame 4, comprising uprights connected by transverse members, is attached to the first frame 1 by means of upper and lower pairs of parallel link arms 5 and 6, only one of each pair being shown.

90 Upper link arm 5 is pivoted to the first and second frames at 5a and 5b respectively, and lower link arm 6 is pivoted to the first and second frames at 6a and 6b respectively.

In the embodiment shown, the actuator 7, a
95 hydraulic ram, is pivoted to the support 2 at pivot 7a, and is connected at its upper end to the pivot 7b between two links 8 and 9. Link 8 is mounted to the first frame at 8a, and link 9 is attached to upper link arm 5 at 5c.

100 A first latch hook 10, shown in *Figure 1*, operates between the first frame 1 and a detent 11 on the support 2 to retain the first frame 1 to the support in the position shown in *Figures 1* and *2*. Bellcrank 12 is pivotally mounted on the first frame 1 and is
105 connected to latch hook 10 by tie 13. A striker 14 is provided on second frame 4 to co-operate with bellcrank 12, as will be described later.

A second latch hook 15 is pivotally mounted to the first frame 1, and has a trip arm 15a which engages
110 on abutment 16 on support 2 when the first frame 1 is in its *Figure 1* position. The operation of the latch hooks 10 and 15 will become apparent from the following description of the operation of the mechanism.

115 Support 2 takes the form of an open rectangular framework, and is advantageously fixed by known means to a refuse collection vehicle or to a refuse compactor or collection container. When a container is to be emptied into the vehicle, the container such
120 as 17 is offered up to the lowered second frame 4 of the mechanism, as shown in *Figure 1*. The container will be engaged by lugs 18 on the second frame and will swing toward the second frame under its own weight when first lifted.

125 Ram 7 is then extended, and the first part of the extension of ram 7 causes the link 8 to rotate clockwise as seen in *Figures 1* and *4* until it contacts a stop 19. This rotation of link 8 causes link 9 to pull
130 upwardly on link arm 5, and thus frame 4 is lifted to the position shown in *Figure 2*. As the second frame